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Classical Military Art and Nuclear/Missile Warfare*

by Major-General of Artillery I. Dzhordzhadze

The principles of military art which have been in existence for centuries and which have become classical and seemingly unchangeable must undergo basic changes under the conditions of conducting nuclear/missile warfare.

Moreover, among us there has arisen the idea that research directed at studying the nature of a future war and the special features of conducting operations will be done within the framework of the principles of military art which have already been formed and which prevail over military research and limit the extent and resolution of their scholarly and practical conclusions. In all works of theory which have been published, there is no lack of recognition of the significance of nuclear/missile equipment and of its main and decisive role. However, the whole meaning of the all-determining role of nuclear/missile weapons, a role which is recognized in theory, disappears when in practice these weapons are scattered among old arms of troops with the purpose of supporting infantry and tank operations.

That is why we consider it necessary to examine the problem of whether it is possible to put the new theory and practice of nuclear/missile warfare within the framework of classical military art or whether a new military art -- the art of nuclear/missile warfare -- must be created to replace the old one.

At first it should be ascertained whether the most effective use of new weapons can be made if they are in the complement of old arms of troops.

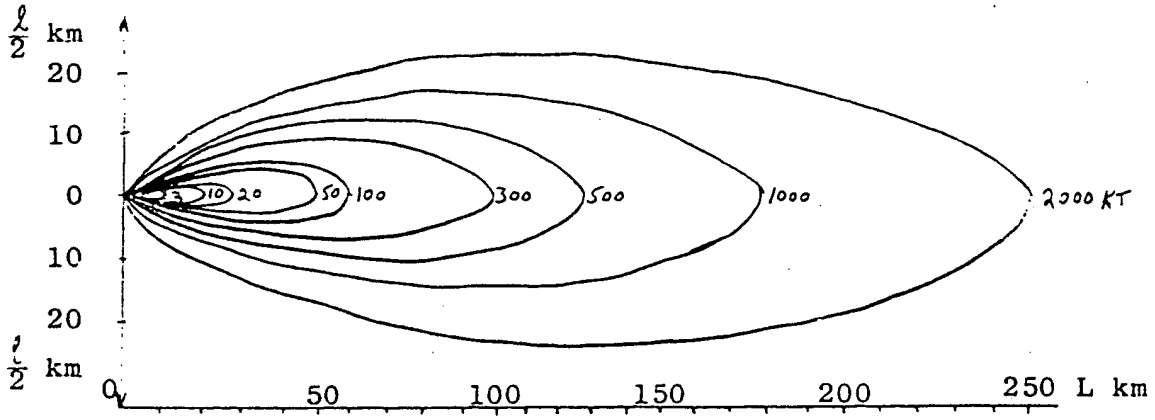
We are excluding this possibility. If motorized rifle and tank troops are given nuclear weapons, then

*The author has in mind that part of nuclear missile war which is conducted within the framework of front operations, and he calls it field warfare.

still, because of the limited capabilities of the infantry and tanks, they will not be able to use the powerful combat features of the new weapons.

As can be seen from Figure 1, 3 two-megaton blasts in combination with 8 half-megaton blasts can destroy everything living and for a prolonged period exclude the possibility of troop combat operations over an area where a field army of the USA is located (23,000 km^2).

It is obvious that after conducting such a nuclear strike there is no need at all for operations over the contaminated territory by infantry and tanks. However, according to all existing canons of classical military art, the infantry and tanks should operate under these conditions, because it is they who are called upon to destroy the opposing enemy forces and carry out his final rout according to the principles for waging armed combat which have been developed.



Equivalent in TNT kilotons	Size and area of the path of the radioactive cloud			Troop elements of the army of the USA (area in km^2)			
	L, Km	l, Km	S, Km^2	Division 20 (10x20)	Corps 2400 (40x60)	Army 23,000 (180x130)	Group of armies 72,000 (360x200)
3	10	1.7	14	15	170	1653	5143
10	18	3.1	45	5	53	511	1600
20	26	4.3	88	3	28	260	818
50	40.8	6.8	222	1	11	104	325
100	57	9.6	438	1	6	53	166
300	98.5	16	1261	1	2	20	57
500	125.4	21	2107	1	1	10	35
1,000	177	30	4248	1	1	5	17
2,000	248	40	8134	1	1	3	8

Figure 1. The number of nuclear bursts needed for the radioactive contamination of ground with a radiation dose of 300 roentgens and a wind speed of 50 kph.

How can one combine in the same area large nuclear bursts which create high radiation levels with strikes by the infantry and tanks? There is only one solution -- to limit the force of nuclear weapon bursts to levels which would not prohibit operations by our own infantry-tank groupings and at the same time would ensure their advance.

Thus, the classical military art of waging infantry-tank warfare forces us to employ a whole arsenal of small nuclear weapons, starting at one kiloton, and limits the use of large bursts. In connection with this, there arises the need to create large supplies of small nuclear warheads, thousands of which would be needed for an operation, and actually issue 200 to 300 to a front. As a result there arises the completely distorted idea that there is always a shortage of nuclear warheads, whereas correct technical and operational calculations on the use of large bursts show that there is a quite sufficient amount of nuclear weapons at the front to accomplish all the tasks in a true nuclear/missile war.

From Figures 1 and 2 one can see that a field army of the USA can be destroyed by 3 two-megaton and 8 half-megaton bursts or 1,653 three-kiloton and 20 half-megaton or 5,143 three-kiloton bursts.

In this it should be stressed that nuclear bursts of high yield make it possible to destroy troops over an enormous area, and thus eliminate the need to seek out and destroy each individual target. Small nuclear bursts, however, are used to destroy specific targets, and this actually is a return to the practice of fire of tube artillery.

Small nuclear weapons do not ensure the complete destruction of the enemy as a whole, but accomplish only a part of this task and leave the achievement of the ultimate purpose to the infantry-tank grouping, whereas, by using nuclear weapons of large yield, one can completely accomplish the task of destroying the enemy in a very short time.

Consequently, there is no justification for striving, by artificial limitation of the technical capabilities of nuclear weapons, to create conditions for simultaneous operations in the same zone with them and with motorized rifle and tank units and large units.

It is inadmissible to have the large variety of small nuclear warheads now used in exercises, and their adaptation to the infantry and tanks simultaneously determines the large variety, also, of missile equipment. The correct technical and operational use of powerful nuclear bursts, however, limits the amount and variety of missile equipment and makes it possible to regulate its yields, having created a group of systems which is small in number.

The large amount and variety of nuclear/missile weapons and their adaptation to the old unwieldy system of controlling infantry-tank operations result in the need to create a large number of automated control systems which become completely unnecessary under the correct conduct of nuclear/missile warfare. Indeed, if the number of nuclear/missile weapons of great yield which are being used is not large, and if the functions of control of nuclear/missile weapons and infantry-tank groupings are clearly limited, then there will be very few installations for automating control of the new weapons, because one can control the old arms of troops without high-speed automated devices.

Thus, one can consider that to a large extent, within the framework of classical military art, the combat capabilities of the new equipment are paralyzed; the use of more effective and economic nuclear warheads of great yield is limited; unnecessary and expensive work is done to create an enormous arsenal of missile weapons which are adapted for the mass use of small nuclear warheads; and for all new and old arms of troops (despite the high speed demanded for this) there are being created numerous electronic machines, although there is no need to automate and complicate all the processes of controlling old arms of troops to an identical degree.

All this has a negative effect on carrying out a new military and technical program.

To give scope to the new military equipment and to determine the correct program for working it out and introducing it, one must decisively reject the use of obsolete canons of classical military art which obstruct

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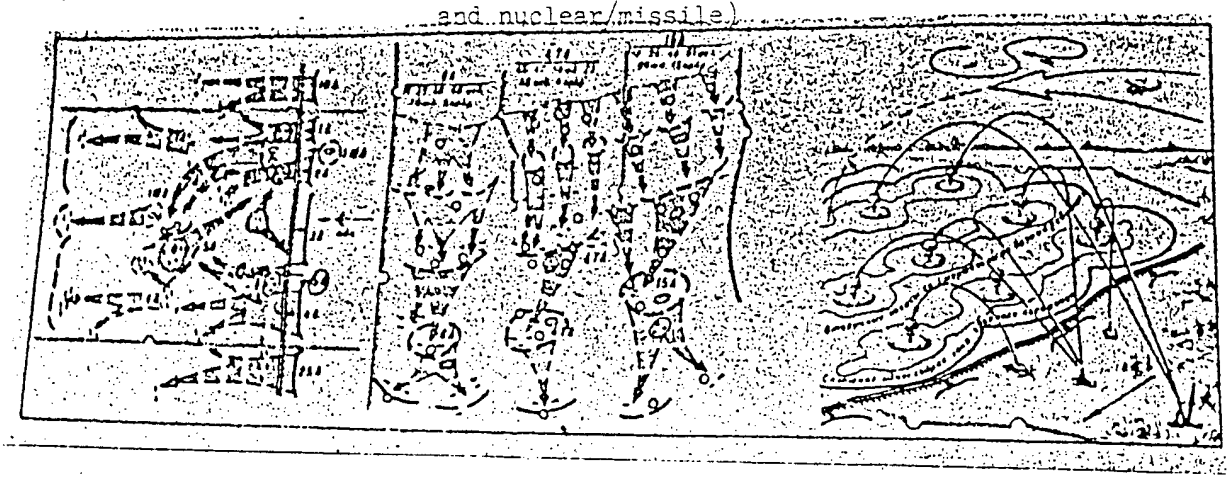
Previous (until 1953) (motorized infantry) | Existing (mixed motorized-infantry and nuclear/missile) | Proposed (nuclear/missile)



10 Army
1 Army
1 Motorized Army
3 Army
Airborne forces
5 Army
4 Army
25 Army

6 Army
4 Tank Army
15 Army

Secondary zones with fatal does of radiation
Continuous single larger zone of nuclear destruction

Figure 2. Fundamentals of Military Art

I and II

1. Each individual target is reconnoitered and destroyed.

2. Cooperation of all arms of troops consists of coordination of troop operations in one zone according to target, place, and time.

3. There is the massing of basic forces and weapons on one or two axes.

4. The system of controlling joint operations of individual arms of troops and weapons for combat is awkward; command posts are unwieldy, have little mobility, and are overloaded with support subunits.

5. There is the presence of millions of ground troops and an enormous amount of varied armaments and equipment within the complement of a front. There are enormous materiel expenditures and complexity in supporting operations.

Conclusions

1. There is no basic difference between former times and now in organizing and conducting troop combat operations and in the procedure and sequence of destroying targets. Despite the existence now of nuclear/missile weapons, everything remains at the level of prenuclear warfare (the only difference is that more powerful ammunition is used). The mechanical unification of the old and new military art has doubly complicated the conditions of conducting an operation, whereas nuclear/missile weapons objectively simplify these conditions.

2. The simultaneous operation of infantry-tank groupings and of nuclear/missile weapons in the same zone paralyzes the technical capabilities of nuclear weapons and gives rise to a shortage of small nuclear warheads.

3. The artificial subordination of nuclear/missile weapons to infantry-tank formations results in maintaining a large number of infantry-tank troops and old weapons of destruction and limits the development of new arms of troops.

III

1. Groups of targets over a large area (in continuous zones) are reconnoitered and destroyed. Thanks to the use of large nuclear bursts, the possibility of a shortage of nuclear warheads will be eliminated.

2. Coordination consists of the most efficient distribution of the efforts of nuclear/missile and infantry-tank groupings according to zones.

3. A careful demarcation of tasks and the specialization of control of new and old arms of troops sharply reduces the organs of control. To control a nuclear/missile army there must be a single set of high-speed machines. Nuclear/missile strikes which are based on large bursts are simple in their planning and conduct.

4. Ground troops are sharply reduced. To combat a ground enemy one must have both a nuclear/missile and combined-arms army.

the efficient use of nuclear/missile weapons. Instead of this, one should work out new technical, operational-tactical, and organizational bases for waging nuclear/missile warfare.

First of all, the new equipment itself shows that not every war which envisages the use of nuclear and missile weapons can be called a nuclear/missile war. Thus, if one uses small nuclear bursts for fire support of infantry and tank operations, this will not be a nuclear/missile war but a somewhat modernized infantry-tank-artillery war.

The calculations cited in Figure 1 show that the most effective energy equivalent for a nuclear burst under field conditions is an equivalent within the .5 to 2 megaton range. In our opinion, this indicator should be acknowledged as the technical criterion of a genuine nuclear/missile war. All the other, smaller bursts must be considered of an auxiliary and incidental nature.

The needed yields of large nuclear bursts and their combination will be determined basically by the accepted plan of radiation contamination of large areas and by the conditions of the combat and meteorological situation.

In the event that 3 two-megaton and 8 half-megaton nuclear bursts are used against a field army of the USA, continuous radiation zones will be formed (Figure 2) with deadly radiation levels. This ensures the reliable destruction of enemy personnel and completely excludes the possibility of his maneuvering because the radiation zones will have the most fantastic shapes forming an intricate maze.

The procedure for conducting nuclear/missile strikes envisages creating continuous zones of nuclear destruction of personnel over large areas with high radiation levels. The personnel of all arms of troops will not be able to operate on ground with such high radiation levels, and, consequently, even the conventional combat equipment will be useless. Under these conditions, there is no longer the need for additional physical destruction of enemy personnel by other means and arms of troops just as there

also is no need for the destruction of the basic part of his combat equipment. Over the enormous areas of the continuous zones of nuclear destruction there is the need primarily to conduct operations of a checking and reconnaissance nature by the forces of bombardment and reconnaissance aircraft in combination with the operations of special groups of airborne forces. Special motorized detachments equipped with special vehicles, equipment, and protective devices can be used occasionally in this area.

The basic task of checking and reconnaissance operations must be to detect and destroy enemy nuclear/missile weapons operating with the aid of remote control and automatic systems without human assistance according to a prior given program.

The procedure and sequence of combating enemy missile troops will also change: at first, antiaircraft guided missiles will be destroyed and then surface-to-surface ones. This will open the possibility for the operations of all arms of air reconnaissance, whereas now antiaircraft guided missiles exclude the combat work of reconnaissance aviation, and this paralyzes all the reconnaissance activities of the front.

Thus, by creating continuous zones of nuclear destruction, the nuclear/missile troops are capable of independently performing the basic task of destroying the enemy over large areas. It is our profound conviction that the operations of large infantry-tank groupings in these zones are inadvisable and even impossible.

Consequently, the need arises to limit the zones of operations of the nuclear/missile and infantry-tank troops according to area instead of the existing principle of joint operations of new and old arms of troops.

Nuclear/missile troops plan and conduct a program of large bursts which create the desired picture of the radiation situation simultaneously over the whole area where the enemy troops are located. The picture of the

zones of complete enemy nuclear destruction will change depending on the given system of layers (sloynost) and the zones of radiation contamination, as well as the combat and meteorological situation. Variations of the plan for nuclear/missile strikes will comprise the basis of the program for conducting large bursts. These programs may be fed into existing computers in advance, and in an instant one can receive the best solution corresponding to the specific situation.

Thus, over the enormous areas where enemy troops are located, one can create a radiation situation in the tactical and operational depth in which enemy personnel would be in continuous radiation zones and would be broken up by zones with deadly radiation levels.

In our opinion, the art of determining and forming such continuous zones of nuclear destruction over enormous areas comprises the basis of military art in nuclear/missile warfare.

In the zones of continuous nuclear destruction, one can provide special corridors free from radiation contamination for the operations of our own infantry-tank and other troop groupings.

These troop groupings can be set aside for occupying enemy territory which is free from high radiation levels. They use and develop the success of the enemy's defeat which was achieved by large nuclear bursts. Therefore, we consider that the main task -- the destruction of opposing enemy forces -- can be accomplished independently by nuclear/missile troops, but the occupation of enemy territory, the consolidation of the success, and support for conducting nuclear/missile strikes can be done by combined-arms groupings equipped with ordinary weapons.

In our opinion, such an efficient distribution of efforts of new and old weapons according to ground, target, and tasks guarantees success in waging nuclear/missile warfare. With this, it must be kept in mind that under the conditions of nuclear/missile warfare one must inevitably

force from the battlefields the basic masses of infantry-tank and other troops equipped with conventional weapons and together with them their complex and unwieldy tactics and operational art and strategy, and one must confirm the new military art based on nuclear/missile methods for waging armed battle.

The purpose of any operation is to destroy the enemy, And we think that this destruction can and must be achieved, not by infantry-tank encirclement and splitting enemy troops, but by destroying them with nuclear weapons. The mighty combat powers of nuclear weapons simplify the strategy of destruction and, on the battlefield, remove the borders of tactical, operational, and strategic scales.

In delivering strategic nuclear/missile strikes, if one must select targets, then in the zone of combat operations of the fronts one must and can use their complete destruction by large nuclear bursts. We consider that we must put a decisive end to conducting front operations by old methods. Old arms of troops and methods of their combat use must be improved, and they must be adapted to the best use of the results of employing nuclear/missile weapons. But one cannot achieve decisive purposes in operations by expanding the capabilities of old arms of troops through equipping them with new weapons but by the unification of everything new (all types of weapons of mass destruction, missile and other means to deliver them, and reconnaissance means) into a single nuclear/missile army which is capable of destroying opposing enemy forces by crushing blows. Simultaneously with this, one must reduce sharply the troops equipped with conventional weapons, and unify motorized rifle, tank, and other conventional troops into homogeneous, combined-arms large units with a limited amount of armament. The basic tasks of these new combined-arms large units and formations will be to occupy enemy territory, consolidate the success achieved by the nuclear/missile strikes on areas free from high radiation levels, and to provide ground cover for a nuclear/missile army and for other troops on their own territory. Thus, the combined-arms large units will not be forced to wage battles and combat

with the main enemy forces as this was understood in the past. There will have to be an occasional use of transport aviation to move combined-arms large units by air to cross zones with high radiation levels.

Large nuclear bursts will reduce to a minimum the number and variety of nuclear and missile weapons. Basically there will have to be nuclear warheads of three types: half-megaton, one-megaton, and two-megaton, and correspondingly with them, three types of missiles with a firing range of up to 1000 km. It is technically more advisable to use fixed strategic missiles for a greater distance.

Thirty to forty launching mounts are able to create a continuous zone of nuclear destruction on the scale of a front. As can be seen, the number of launching mounts with ready missiles is not large. However, for their reliable use and support one must have a whole nuclear/missile army which should include: nuclear/missile divisions, a division for comprehensive reconnaissance -- to receive and clarify reconnaissance data -- checking and reconnaissance divisions conducting special operations over the zones of complete nuclear destruction, divisions of field cover for nuclear/missile troops, and technical and supply units and large units.

Thus, all the basic forces set aside to fight against a ground enemy can be united into two armies: a nuclear/missile army and a combined-arms army. The decisive and leading role of the commander of the nuclear/missile army is obvious, and therefore he will have to coordinate the operations of these armies. Apparently, there will be no need to create an unwieldy front directorate with general control functions. It is enough to supplement the command of the nuclear/missile army by a coordination group to establish agreement for operations on land and in the air.

It is natural that the methods and forms of military art which are based on the principles for waging nuclear/missile warfare under field conditions will exclude several generally accepted classical propositions, and the old

and new can be compared in Figure 2.

In our opinion, victory in field warfare will be achieved by that side which first goes over to genuine nuclear/missile warfare and takes advantage of the blunders of an enemy who adheres to the old principles of infantry-tank warfare. Thorough exploitation of enemy mistakes which stem from the old inherited principles of waging war, particularly in the initial period, will comprise a very important part of the new military art.

If we begin now to reorganize our armed forces in accordance with the principles of military art of genuine nuclear/missile warfare, then we shall gain several years and shall outstrip the most highly developed armies of the world in this regard.

* * *

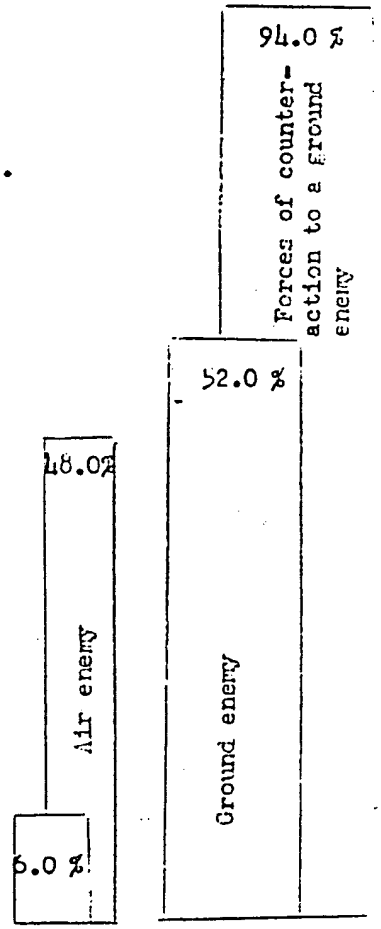
The problems of combating missile and aviation delivery means in the flight trajectory in the air and space are the element of nuclear/missile warfare which has been least resolved.

Investigation of the nature and operations of a probable air and ground enemy and a comparision of them with the capabilities of our ground troops reveals a sharp discrepancy between our forces of counteraction and the forces of enemy air invasion.

Table 1

Proportion of Air and Ground Attack of an Army of the USA and the Forces of Counteraction of the Ground Troops of the Soviet Army

		Means Used	Proportion of the strike and of the forces of counteraction to it, percentage		
			Field Army (Army)	Gr. of armies (front)	Ave. prop.
Proportion of the air attack of an army of the USA, percentage	Nuclear weapons	Cruise missiles Guided missile and free rocket aircraft	60	51	56
	Conventional weapons	Aircraft	46	35	40
	Average proportion of the strike		53	43	48
Proportion (percentage) of the forces of counteraction (antiaircraft troops of ground troops of the Soviet Army in relation to the whole complement of large units(formations) of ground troops			7.2	8.4	6*
Proportion of ground attack of an army of the USA, percentage	Nuclear weapons	Ballistic missiles Cruise missiles Artillery	40	49	44
	Conventional weapons	Artillery	54	65	60
	Average proportion of the strike		47	57	52
Proportion of forces of counteraction of the Soviet Army			92.8	91.6	94



*This shows the average arithmetical calculation of the proportions of the complement of the means of the PVO (according to the number of weapons and launching mounts) motorized rifle divisions, tank divisions, heavy tank divisions, army, and front

These calculations (Table 1) show that the proportion of means of enemy air attack in the use of nuclear and conventional weapons comprises 48 percent and the means of ground attack 52 percent, while our forces of counteraction to an air enemy on the flight trajectory (PVO troops) comprise only 6 percent of ground troops, and to the ground enemy, 94 percent.

Thus, one can observe an obvious discrepancy between the complement of our ground troops and the nature of operations of the air and ground enemy. The operations of the probable enemy bear a typical air-ground character with an almost equal ratio of the yield of strikes from the air and on the ground. The counteraction of our ground troops, however, essentially has a one-sided, ground nature, with an obvious shortage of the forces of counteraction to the air enemy.

One observes a different picture in examining the forces of counteraction of our probable enemy (the army of the USA) (Table 2).

The proportion of our means of air attack of a front in using nuclear and conventional weapons comprises 27 percent and the means of ground attack, 73 percent.

Table 2

Proportion of Air and Ground Attack of Ground Troops of the Soviet Army and the Forces of Counteraction of the Army of the USA

		Means Used	Proportion of the strike and of the forces of counteraction to it, percentage		
			Army Field army	Front (Group of armies	Avg. prop.
Proportion of the air attack of the ground troops of the Soviet Army, percentage	Nuclear weapons	Cruise missiles Aircraft	11	25	18
	Conventional weapons	Aircraft	30	40	35
	Average proportion		21	32	27
Proportion of forces of counteraction (PVO means of the ground troops) of the army of the USA			34.8	34.8	25*
Proportion of ground attack of the ground troops of the Soviet Army, percentage	Nuclear weapons	Ballistic missiles, cruise missiles	89	75	82
	Conventional weapons	Artillery and mortars	70	60	65
	Average proportion		79	67	73
Proportion of the forces of counteraction of the army of the USA			65.2	65.2	75

27.0 %

Forces of enemy counteraction to an attack by our troops from the air

25.0 %

Means of attack of our troops from the air

75.0 %

73.0 %

Means of attack of our troops from the ground

Forces of enemy counteraction to an attack of our troops from the ground

*This shows the average arithmetical calculation of the proportion of the complement of the means of the PVO (according to the number of weapons and launching mounts) of infantry divisions, armored divisions, /2 letters missing/, infantry corps, and of a group of armies

The forces of enemy counteraction to our means of air attack (antiaircraft guided missiles and antiaircraft artillery), however, comprise 25 percent of his ground troops, and to the means of ground attack, 75 percent.

Thus, the complement of enemy ground troops almost completely corresponds to the probable nature of our strikes against him, Taking into consideration the pronounced ground-air nature of the possible operations of our troops with a prevalence of ground strikes over air strikes by about 2.7 times, the counteraction of the enemy also has a pronounced ground-air nature with the predominance of the forces of counteraction to a ground attack over the forces of counteraction to an air attack.

Consequently, there is a sharp discrepancy between the complement of our ground troops and the nature of the possible attack from the air, something which is not observed among our probable enemy. This discrepancy which has arisen must be eliminated by a sharp increase in the PVO troops of the ground troops and in our means of air attack.

The air-ground nature of nuclear/missile warfare is a new, specific, and more complex side to the matter. The successful struggle in the air and the destruction of an air enemy is a decisive element in ensuring success in operations or campaigns.

PVO troops of a front who are equipped with modern nuclear antiaircraft systems act as the main force in the antimissile and antiaircraft struggle under field conditions. Antiaircraft defense of troops is now built and founded on the use of antiaircraft guided missiles. Therefore, all the old means of fighting against an air enemy can serve only as a supplement to the main PVO weapon - the antiaircraft guided missile - and in principle the new bases of the combat use of these missiles will determine the nature of the PVO troops as a whole.

Antiaircraft guided missiles make a start at creating a highly effective and constantly functioning zonal PVO system with which, instead of covering individual objectives (objective PVO), and periodic operations of fighter aviation, there is brought about simultaneously a constant cover of

all the numerous objectives, and the numerous linked zones of destruction of the antiaircraft guided missiles form a whole system for the struggle in the air in the zone of the whole front.

Antiaircraft guided missiles of various types are capable of accomplishing independently the tasks of fighting against all air targets, and this excludes the need to use other, old PVO means in the zone of their operations. This simplifies the conditions of coordination. By its operations, fighter aviation must supplement the PVO of the troops outside the destruction zones of the antiaircraft guided missiles.

Using electronic computers, we conducted research on the effectiveness of antiaircraft guided missile operations and of fighter aviation in a single zone and in various zones. It was discovered that in limiting the zones of operations, the effectiveness of antiaircraft guided missiles increased by more than two times.

Consequently, also under field conditions, it is becoming possible to employ the most convenient and simple principle of coordination of new and old PVO means by limiting their zones of operations according to the terrain. In connection with this, the existing belief that supposedly no single means of fighting against an air enemy can accomplish independently all the tasks of the PVO of the troops, and that there must be close coordination between completely different types of means within a single zone, is losing its force. To give independence to the new weapons in an operational-tactical and organizational manner -- this, in our opinion, is the main task of military science at the new stage of development of our armed forces.

The experience of exercises conducted with the use of electronic computers proved the great effectiveness of a constantly functioning system of zonal PVO. Together with this, there arose an urgent need for centralized control of the large forces of the antiaircraft guided missiles. The experience of exercises and the results of theoretical research confirm once more, not only logically but also mathematically, the advisability of unifying all antiaircraft guided missiles and other troops of the PVO which form a zonal system into single PVO large units and formations.

During recent years, however, there has been a process of reducing and splitting all troop large units of antiaircraft guided missiles and of forming separate subunits and units in place of them. Thus, there has been created a "scattering" of antiaircraft guided missile subunits of the troop PVO, and this excludes the possibility of creating a zonal PVO system. All this causes a sharp decrease in the organs and means of control of the PVO chiefs (nachalnik).

Right now the PVO of ground troops has been reduced to its minimum level for the whole history of its existence. What are the reasons for such a disastrous situation for the youngest and most progressive arm of troops?

In our opinion, the basic reason is that instead of a single, correct, integral theory for unifying and centralizing PVO troops, in practice there is being carried out a differential theory for their splitting and decentralization.

This has resulted in serious consequences -- the apparatus of the chiefs of the PVO troops of a front and of armies now must control masses of small subunits without having any resources for doing this. They were isolated from the troops and were transformed into secondary organs of combined-arms staffs, capable only of preparing the antiaircraft defense of the troops, but without being able to direct the PVO means to repel raids.

Such an imperfect organization of the PVO system for troops and of its control could not help but lead to an essentially incorrect use of the antiaircraft guided missiles -- the most reliable PVO means, which is called upon to put zonal cover into practice. Hundreds and thousands of missiles will be spent for nothing because, lacking an organizing principle and centralized system of automated control, some of the targets will be fired at by an unjustifiably large number of missiles and the next will fly with impunity over the battle formations of the troops.

By attaching the antiaircraft guided missile subunits directly to the cover objectives -- which actually also means including them in the makeup of divisions -- they are artificially transformed into a means of direct cover.

As a system, zonal cover is excluded, and this weakens the PVO as a whole.

The creation of an automated system of centralized control of PVO troops is one of the most important problems of the present time. Its resolution is made much more difficult if there is "scattering" of the antiaircraft guided missile units. The movement, building up of the zone of cover, the replacement of units which have been put out of action, and distribution of targets are either all excluded or will be unsystematic and inefficient.

Despite scientific and actually proven principles, it is proposed that the antiaircraft guided missile models which have not yet appeared also be split among subunits, instead of using them in a centralized way on the scale of PVO large units and formations.

We consider that the need to create a system of zonal PVO inevitably confirms the need which arose long ago to create a PVO army as a powerful means for antimissile and antiaircraft combat under field conditions.

Under modern conditions, with the enormous satiation of PVO troops of fronts with antiaircraft missile means, it would be completely correct to examine the PVO of troops as the most massive missile arm of troops and as the first PVO echelon of the State as a whole, and to devote particular attention to its development.

We must create a special industry of troop antiaircraft guided missiles, of automated groups, and a system of control; a special institute for antiaircraft guided missiles and automation; we must accelerate the introduction of troop antimissile systems; and we must create computing centers, an academy, and ranges for the accelerated introduction of mathematical methods and machines for controlling PVO troops under field conditions.

Nuclear energy as a means of destruction, missiles as means of delivery, and electronics as a means of control, are the basic components of a technical base on which modern armed forces, including the PVO troops (for antimissile and antiaircraft combat), must rest.

* *

The change from an army intended to wage infantry-tank warfare to an army intended to wage nuclear/missile warfare must be understood not as a document but as a very serious process arising from several military reforms.

During the history of the existence of organized armies, never has one felt so sharply the need to make new military reforms as now. Despite the fact that nuclear/missile weapons caused the need to change from infantry-tank warfare to new, nuclear/missile warfare, and thus determined the basic changes in building the armed forces, in our opinion this far-reaching revolution was not marked or consolidated by appropriate military reforms. It is not out of place to recall that with the small numerical strength of the Red Army and its weak armaments, during the period of 1924 to 1928 military reforms were made under the direction of the military commission of the Central Committee of the Russian Communist Party (Bolsheviks). The course of military reforms and the five-year plan for building the armed forces were discussed at two plenums of the Central Committee of the Russian Communist Party (Bolsheviks), at the 13th, 14th, and 15th Party Congresses, and at the 3rd and 4th All-Union Congresses of Soviets.

It is quite obvious that at the same high level one should make new and more complex and important military reforms to ensure the decisive reorganization of the armed forces and their readiness to wage nuclear/missile warfare.

We are convinced that military reforms can never be replaced by individual orders, ukases, or measures which make it possible to resolve problems which may be very important but which are still particular problems, expecially if this concerns the creation of new arms of troops. The formation of new types of armed forces and arms of troops must occur on the basis of a law and must be accompanied by a corresponding change in the role and place of old arms of troops, and this is possible only by making thoroughly based and, consequently, firm military reforms.

Military reforms must legalize the formation of new nuclear and missile arms of troops and must simultaneously determine the tasks and role of the old arms of troops.

To wage field warfare one must create two new missile arms of troops (nuclear/missile troops and troops for antimissile and antiaircraft combat) and one arm of troops equipped with conventional weapons.

The tasks of the strategic armed forces and the tasks for waging field warfare must also be carefully defined by military reforms. The strategic armed forces are called upon to destroy and neutralize the enemy's military and economic potential and to protect our country.

As is well known, nuclear/missile troops and troops for antimissile and antiaircraft combat (The PVO Troops of the Country) will be organized on a strategic scale. Such a successful combination of new principles of attack and defense on a strategic scale, obviously, can and must be spread to the conduct of field warfare.

In our opinion, military districts, which long ago adapted themselves to waging infantry-tank warfare, also must reorganize themselves in accordance with the new conditions of nuclear/missile warfare. It is obvious that the internal districts must prepare themselves for strategic nuclear/missile strikes and for antiair defense, and the border districts must prepare themselves to wage field warfare with the aim of destroying the armed forces on the fronts.

The combination of strategic nuclear/missile strikes and antimissile operations conducted by internal districts with the nuclear/missile strikes and antimissile operations conducted by border districts will be one of the basic tasks of military strategy.

The complete independence of each district makes for their interchangeability and guarantees the reliability of fulfilment of any strategic and operational task, even when considerable forces are put out of action.

To ensure the complete independence and reliability of operations of each district, during the initial period of a war one must reject the existing methods of rear area support based on supplying the troops with all weapons, including missile weapons, before and during the battle

and must change to the principle of early supply of troops with all types of nuclear and missile weapons. Early nuclear/missile supply and engineer preparation of troops in the Theater of Military Operations create genuine conditions for the successful and timely conduct of operations during the initial period of the war.

For the practical instituting of military reforms and transformations in the army one must decisively activate military science. All the problems touching the various areas of reality and practice are resolved now only on a scientific basis. In our opinion, military science is illuminating in a completely unsatisfactory way the path for the practice of military affairs, and to a considerable degree it is still concerned with the scientific basis of problems which have already been resolved. It appears to us that military science concerns itself more with studying the most general laws. It is no accident that a definition of military science is still prevalent according to which Soviet military science is the sole system of knowledge about the preparation and conduct of an armed struggle to defend the Soviet Union from imperialist aggression. In the highest degree this is a general definition. Military science must be the most specific area of knowledge, despite the fact that it relies on the highest and most complex achievements of technology and the intellect.

In our opinion, military science is the science for creating and constantly improving the technical program of armaments, a program which is combined with the most advantageous methods for employing the armed forces and the forms of their organization. The military science of our time fluctuates between the ancient past and the still unknown future. The matter is further complicated because the past stubbornly refuses to relinquish its positions. Under these conditions all our knowledge and experience must be united to work out a new and more intelligent doctrine of field warfare.

If one must put at the basis of this doctrine some expressed views, then it is our deep conviction that they should be the following:

— to save hundreds of billions of rubles by bringing about the best long-range military-technical program based on the recognition of the role of large nuclear bursts and

by ceasing the production of unneeded and already quite worthless small nuclear, missile, electronic, and numerous conventional armaments;

— to reduce the armed forces sharply and to receive enormous economic benefits, and at the same time to make them incomparably stronger and more effective in combat;

— to simplify the art of waging armed struggle, to reduce the organs of control sharply, and thus to make it easy to control troops under the most complex field conditions.

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